R2807

Sub. Code
525201

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Botany

TAXONOMY OF ANGIOSPERMS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. The scope of taxonomy includes which of the following? (CO1, K1)

   (a) Classification (b) Identification

   (c) Nomenclature (d) All of the above

2. Who is known as the 'Father of Indian Botany'? (CO1, K2)

   (a) J. D. Hooker (b) William Roxburgh

   (c) Carl Linnaeus (d) George Bentham

3. Which classification system is based on evolutionary relationships? (CO2, K2)

   (a) Artificial (b) Natural

   (c) Phylogenetic (d) Chemotaxonomic

4. APG IV classification is primarily based on : (CO2, K2)

   (a) Morphological characteristics

   (b) Molecular phylogenetics

   (c) Chemical analysis

   (d) Evolutionary studies of gymnosperms

5. The process of designating a type specimen for a plant name is called : (CO3, K3)

(a) Nomenclature (b) Citation

(c) Typification (d) Classification

6. Which type of specimen serves as the reference for a plant species? (CO3, K4)

(a) Isotype (b) Holotype

(c) Paratype (d) Lectotype

7. Menispermaceae is also known as the : (CO4, K4)

(a) Moonseed family (b) Bitter gourd family

(c) Fig family (d) Rose family

8. The Vitaceae family is best known for : (CO4, K5)

(a) Production of latex

(b) Climbing plants with tendrils

(c) Timber trees

(d) Paper chromatography

9. Which economically important product is derived from Rubiaceae? (CO5, K5)

(a) Quinine and coffee

(b) Rubber

(c) Perfumes and essential oils

(d) Cereal grains

10. Lamiaceae is commonly referred to as the : (CO5, K5)

(a) Mint family (b) Bean family

(c) Grass family (d) Rose family

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Define plant taxonomy and explain its scope. (CO1, K1)

Or

(b) Briefly describe the contributions of early botanical explorations in Tamil Nadu. (CO1, K1)

12. (a) Define chemotaxonomy and mention its applications in taxonomy. (CO2, K2)

Or

(b) Describe the process of herbarium preparation. (CO2, K2)

13. (a) Define typification and mention the types of types in botanical nomenclature. (CO3, K3)

Or

(b) Differentiate between effective and valid publications in botanical nomenclature. (CO3, K3)

14. (a) Write the systematic position and diagnostic characters of the family Annonaceae. (CO4, K6)

Or

(b) Highlight the economic importance of the family Myrtaceae. (CO4, K4)

15. (a) Describe the systematic position and diagnostic characters of Rubiaceae. (CO5, K5)

Or

(b) Write a short note on the diagnostic features and one economically important plant of Sapotaceae. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Explain the role of plant taxonomy in modern botanical research and biodiversity management. (CO1, K1)

Or

(b) Provide a detailed account of the contributions of Indian botanists to plant taxonomy. (CO1, K3)

17. (a) Discuss the history and evolution of plant classification systems. (CO2, K2)

Or

(b) Critically analyze the APG IV classification system and its significance in modern taxonomy. (CO2, K4)

18. (a) Describe the structure and applications of taxonomic keys, highlighting their advantages and limitations. (CO3, K3)

Or

(b) Discuss the historical development and significance of the International Code of Nomenclature (ICN) in botanical studies. (CO3, K4)

19. (a) Provide a detailed account of Menispermaceae, including its distinguishing features and economic significance. (CO4, K5)

Or

(b) Discuss the diagnostic features of Vitaceae and its economic relevance in viticulture and other industries. (CO4, K4)

20. (a) Discuss the diagnostic features, systematic position, and economic importance of Solanaceae. (CO5, K5)

Or

(b) Describe the systematic position, key features, and global economic importance of Poaceae, with examples of staple crops. (CO5, K1)

R2808

Sub. Code
525202

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Botany

PLANT ANATOMY, EMBRYOLOGY AND MORPHOGENESIS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. Apical cell theory of shoot apex is given by Hofmeister and supported by (CO1, K1)

   (a) Clowes (b) Nageli

   (c) Both (a) and (b) (d) None of these

2. Which of the following tissue is involved in water conduction? (CO1, K1)

   (a) Xylem and Phloem

   (b) Tracheids and trachea

   (c) Sclerenchyma and Parenchyma

   (d) Xylem fibres and bast fibres

3. Heart wood is also called (CO2, K2)

   (a) Duramen (b) Sap wood

   (c) Porous wood (d) Non-porous wood

4. Which of the following wood is durable? (CO2, K2)

(a) Sap wood (b) Soft wood

(c) Heart wood (d) Spring wood

5. Microsporogenesis leads to the formation of _____ microspores from a single MMC. (CO3, K3)

(a) One (b) Two

(c) Four (d) Eight

6. Double fertilization is due to the fusion of (CO3, K3)

(a) Male gametes with egg and secondary nucleus

(b) Male gametes with egg and synergid

(c) Male gametes with egg and polar nuclei

(d) Male gametes with two eggs

7. _____ may be defined as occurrence of two or more embryos in one ovule. (CO4, K4)

(a) Polyembryony (b) Nucellus

(c) Parthenocarpy (d) Embryogenesis

8. The white edible part of maize is (CO4, K4)

(a) Pericarp (b) Seed coat

(c) Endosperm (d) Seed

9. This is wound hormone (CO5, K5)

(a) Phyllocaline (b) Auxin

(c) Hormone only (d) Necrohormone

10. Totipotency refers to _____. (CO5, K5)

(a) Development of fruits from flowers in a culture

(b) Development of an organ from a cell in a culture medium

(c) Flowering in a culture medium

(d) All of the above

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Explain the structure and function of lenticels. (CO1, K1)

Or

(b) Categories various root apex theories. (CO1, K1)

12. (a) Outline the secondary structure of dicot stem. (CO2, K2)

Or

(b) Compare reaction wood and tension wood. (CO2, K2)

13. (a) What is triple fusion? Where and how does it take place? (CO3, K3)

Or

(b) Differentiate between orthotropous and circinotropous ovule. (CO3, K3)

14. (a) What is parthenocarpy? Explain its role in the development of fruits. (CO4, K4)

Or

(b) Add a note on apomixis. (CO4, K4)

15. (a) List out various forms of differentiation of vascular tissue. (CO5, K5)

Or

(b) Explain the factors affecting morphogenesis. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Illustrate the structure and function of phloem components. (CO1, K1)

Or

(b) Describe in detail about the origin, structure and the role of cambium. (CO1, K1)

17. (a) Give an account on the anomalous secondary thickening in dicot stem with an example. (CO2, K2)

Or

(b) Discuss about various forms of wood. (CO2, K2)

18. (a) List out the method to overcome the self-incompatibility in plants. (CO3, K3)

Or

(b) Write an essay on the development of microsporogenesis. (CO3, K3)

19. (a) Explain in detail about the types of endosperm. (CO4, K4)

Or

(b) What is polyembryony? Classify various forms of polyembryony. (CO4, K4)

20. (a) Explain in detailed about the molecular and genetic basis of morphogenesis. (CO5, K5)

Or

(b) Is there any relationship between dedifferentiation and the higher degree of success achieved in plant tissue culture experiments? Discuss. (CO5, K5)

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R2809

Sub. Code
525203

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Botany

PLANT PHYSIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective questions by choosing the correct option.

1. First step in absorption of water by root hair (CO1, K1)
   (a) Osmosis (b) Simple diffusion
   (c) Osmotic diffusion (d) Imbibition

2. Aquaporins are formed in cell membranes by (CO1, K3)
   (a) Integral membrane proteins
   (b) Peripheral membrane proteins
   (c) Phospholipids
   (d) None of these

3. Transport of iron through channels is always (CO2, K5)
   (a) Passive (b) Active
   (c) Both (a) and (b) (d) None of these

4. Accumulation of phytochelatins in plant cell vacuole is indicative of (CO2, K2)
   (a) Salt stress (b) Heavy metal stress
   (c) Heat stress (d) Both (a) and (c)

5. How many carboxylation reaction occur in C4-pathway? (CO3, K4)

(a) One (b) Two

(c) Three (d) Four

6. Photolysis of water in photosynthesis requires the presence of (CO3, K5)

(a) Mn^{++} ions (b) Mg^{++} ions

(c) Mn^{++} and Cl^{-} ions (d) K^{+} and Cl^{-} ions

7. During photorespiration, oxygen is consumed at, (CO4, K2)

(a) One place (b) Two places

(c) Three places (d) Four places

8. Much of the free energy released during oxidation of pyruvate in TCA cycle is initially stored in the form of (CO4, K4)

(a) Reduced coenzymes

(b) Oxidised coenzymes

(c) ATP molecule

(d) F complex

9. In plants, richest source of phytochrome are, (CO5, K1)

(a) Stem (b) Seedlings grown in light

(c) Leaves (d) Etiolated seedlings

10. Brassinosteroids are biosynthesized in plants from (CO5, K3)

(a) Sitosterol (b) Cholesterol

(c) Campesterol (d) Phenolics

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Explain the role of aquaporins in water absorption. (CO1, K1)

Or

(b) Outline the process of transpiration and its affecting factors. (CO1, K3)

12. (a) Compare active and passive absorption of ions across cell membrane. (CO2, K5)

Or

(b) Summaries the mechanism of tolerance in plants under metal toxicity. (CO2, K2)

13. (a) Explain the red drop and Emerson's effect. (CO3, K4)

Or

(b) Illustrate the CAM pathway. (CO3, K5)

14. (a) Outline the process of glycolysis. (CO4, K2)

Or

(b) Summarize the lipid metabolism of oil seeds. (CO4, K4)

15. (a) Interpret the nature and physiological role of gibberellins in plants. (CO5, K1)

Or

(b) Express the concept of florigen and stimulus induction in flowering. (CO5, K3)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Interpret the mechanism of stomatal movement. (CO1, K1)

Or

(b) Express the pathways of water movement. (CO1, K3)

17. (a) Illustrate the mechanism of tolerance under drought and salinity stress in plants. (CO2, K5)

Or

(b) Outline the process of phloem loading and unloading. (CO2, K2)

18. (a) Compare the PS-I and PS-II reaction in brief. (CO3, K4)

Or

(b) Summarize the calvin cycle. (CO3, K5)

19. (a) Explain the electron transport chain in respiration. (CO4, K2)

Or

(b) Brief notes on photorespiration and its significance. (CO4, K4)

20. (a) Elaborate on functional role of Abscisic acid and Jasmonic acid in plants. (CO5, K1)

Or

(b) Explain in brief about the vernalization process. (CO5, K3)

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R2810

Sub. Code
525204

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Botany

PLANT BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following type of non-covalent bonds hold DNA together? (CO1, K1)

   (a) Hydrophobic interactions

   (b) Van der Waals interactions

   (c) Ionic bonds

   (d) Hydrogen bonds

2. What is the full form of pH? (CO1, K1)

   (a) Positive Hydrogen

   (b) Proton of Hydrogen

   (c) Potential Hydrogen

   (d) Positron

3. A chemical reaction for which the associated free energy change (AG) is large and negative (CO2, K2)

(a) is likely to be irreversible in the cell

(b) cannot occur spontaneously

(c) will occur spontaneously

(d) will occur very rapidly

4. The non-protein organic part of the enzyme is called _____. (CO2, K2)

(a) Co-factor

(b) Co-enzyme

(c) Apo enzyme

(d) Isoenzyme

5. Which of the following is not a monosaccharide with five carbon atoms? (CO3, K4)

(a) Xylulose

(b) Ribulose

(c) Arabinose

(d) Trehalose

6. The first step in the β-oxidation of fatty acyl CoA is catalyzed by _____. (CO3, K1)

(a) NADH dehydrogenase

(b) Succinate dehydrogenase

(c) Acyl Co-A dehydrogenase

(d) Acyl Co-A acetyl transferase

7. All hydrophobic amino acids share which of the following properties? (CO4, K4)

(a) Polar uncharged R groups

(b) Non polar uncharged R groups

(c) Acidic groups

(d) Basic R groups

8. The length of one turn of DNA is _____. (C04, K3)

(a) 3.4 A°

(b) 3.14 A°

(c) 3.04 A°

(d) 34 A°

9. Who proposed that membranes are phospholipid bilayer between two layers of hydrophilic proteins? (CO5, K1)

(a) H. Davson and J. Danielli

(b) S. Singer and G. Nicolson

(c) E. Gorter and F. Grendel

(d) C. Overton

10. _____ is an aromatic polymer of phenyl propane units. (CO5, K1)

(a) Pectin

(b) Cutin

(c) Lignin

(d) Chitin

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Write briefly on the forces involved in stabilizing the tertiary structure of a protein. (CO1, K2)

Or

(b) Summarize the major applications of biochemistry in agriculture. (CO1, K4)

12. (a) Describe and relate the following terms:

(i) Enthalpy

(ii) Entropy

(iii) Gibbs free energy. (CO2, K1)

Or

(b) Explain the mechanism of enzyme action. (CO2, K5)

13. (a) Distinguish between storage polysaccharides and structural polysaccharides. (CO3, K4)

Or

(b) Illustrate the reactions of glyoxylate cycle. (CO3, K1)

14. (a) Explain on

(i) Aromatic amino acids

(ii) Non-protein amino acids. (CO4, K1)

Or

(b) Differentiate the structures of DNA and RNA. (CO4, K4)

15. (a) Classify the plant secondary metabolites and discuss their biological functions. (CO5, K3)

Or

(b) Describe the structural organization of cellulose synthase complex. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Define and discuss the unique characteristics of pH and buffers. (CO1, K2)

Or

(b) Describe covalent and various types of non-covalent bonds. (CO1, K4)

17. (a) Explain the following: (CO2, K2)

(i) ATP as cellular energy currency

(ii) Redox potential

Or

(b) Relate the enzyme kinetics with Michaelis-Menten equation and discuss the facts. (CO2, K1)

18. (a) Classify the carbohydrates with suitable examples and discuss their functions. (CO3, K3)

Or

(b) Explain the steps of biosynthesis of fatty acids. (CO3, K2)

19. (a) Write an essay on different structural levels of proteins. (CO4, K5)

Or

(b) Describe the salient features of Watson and Crick model of DNA structure. (CO4, K1)

20. (a) Give the schematic illustration of plasma membrane and comment on the composition and functions. (CO5, K1)

Or

(b) Discuss the general biosynthesis pathway of lignin. (CO5, K2)

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R2811

Sub. Code
525503

M.Sc. DEGREE EXAMINATION, APRIL – 2025

Second Semester

Botany

Elective: HERBAL TECHNOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. The first having the concept of Ayurveda is ————————. (CO1, K1)

   (a) Atherveda (b) Charka Samhita

   (c) Sushruta Samhita (d) All

2. Siddha system of medicine originate from (CO1, K1)

   (a) Tamil culture (b) Bengali culture

   (c) Punjabi culture (d) North east culture

3. Which of the following plants contains the compounds gedunin and nimbolid? (CO1, K1)

   (a) *Curcuma longa*

   (b) *Azadiractaindica*

   (c) *Cinchona officinalis*

   (d) *Ocimum sanctum*

4. Ashwagandha belongs to genus (CO1, K1)

(a) Withania (b) Solanum

(c) Lycopersicum (d) None of the above

5. The morphine obtained from opium is a (CO1, K1)

(a) Tannin (b) Alkaloids

(c) Gums (d) Latex

6. Study of drug plants is known as (CO1, K1)

(a) Pharmacy (b) Pharmacology

(c) Pharmacognosy (d) Pharmaceutical chemistry

7. Special processing which used to treat selected herbs? (CO1, K1)

(a) To reduce toxicity

(b) To modified their therapeutic activities

(c) Improve the purity percentage

(d) All

8. Alkaloids are ———————— type of substances. (CO1, K1)

(a) Acid (b) Neutral

(c) Basic nitrogenous (d) Chemical

9. Which of the following is/are used to strengthen the immune system and cope with physical and emotional stress? (CO1, K1)

(a) *Ocimum sanctum* (b) Curcuma longa

(c) *Azadirachta indica* (d) *Rosa indica*

10. Curcumin is extracted from (CO1, K1)

(a) Turmeric (b) Kokum

(c) Ginger (d) Cury leaf

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Describe about the history of herbal medicines. (CO1, K1)

Or

(b) Give elaborate notes of Siddha medicine and uses. (CO1, K2)

12. (a) Give diagnostic features of Zingiberaceae family and economic importance. (CO2, K2)

Or

(b) What are the different parts of plants are used as a medicine? Provide examples. (CO2, K1)

13. (a) What is drug? And how they are classified? (CO3, K3)

Or

(b) Discuss about a Raw drugs-methods of extraction. (CO3, K2)

14. (a) What are poisonous plants and how they are harm to humans? With examples. (CO3, K3)

Or

(b) Discuss about "Bio-piracy and role in herbal industries. (CO4, K1)

15. (a) Cultivation of medicinal plants is necessary-justify. (CO5, K2)

Or

(b) What is aromatic plants? How Do Aromatic Plants Differ from Commonly Available Plants? (CO5, K3)

Part C ($5 \times 8 = 40$)

Answer **all** the questions not more than 1000 words each.

16. (a) Give an elaborate note on "Indian system of Medicines". (CO1, K1)

Or

(b) How do Ayurveda and Siddha medicine utilize plants to treat diseases and restore balance in the body? (CO1, K2)

17. (a) Investigate the general features and medicinal uses of the following families. (CO1, K3)

(i) Apocyanaceae

(ii) Lamiaceae

(iii) Euphorbiaceae

Or

(b) What is the importance of medicinal plants in treating diseases, and can you provide examples of commonly used medicinal plants and their benefits? (CO1, K2)

18. (a) What is adulteration? And their methods, types and how they are detected? (CO1, K3)

Or

(b) How are herbal medicines classified in pharmacology, and what are some examples of commonly used herbal drugs in pharmaceutical applications? (CO1, K2)

19. (a) Discuss about Conservation of endangered medicinal plants. (CO1, K1)

Or

(b) What are antidote plants, how are they used to treat poisoning or toxic conditions, and can you provide some examples of plants known for their antidotal properties? (CO1, K4)

20. (a) Give importance of agro-techniques in medicinal plant propagation. (CO1, K1)

Or

(b) What are the key agro-techniques used in sustainable farming, and how do they contribute to improving crop yield and soil health? (CO1, K3)

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